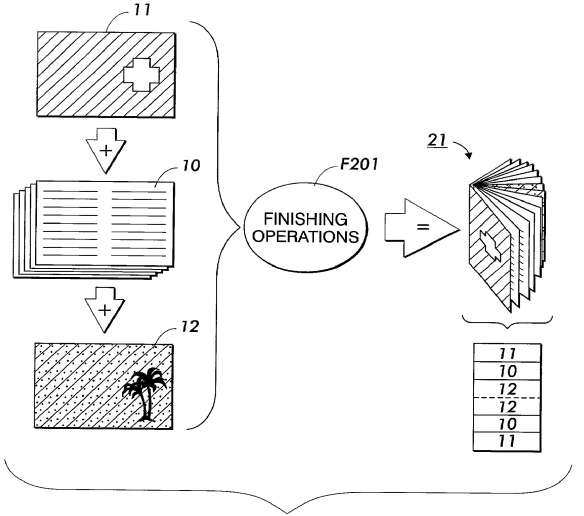

FIG. 1

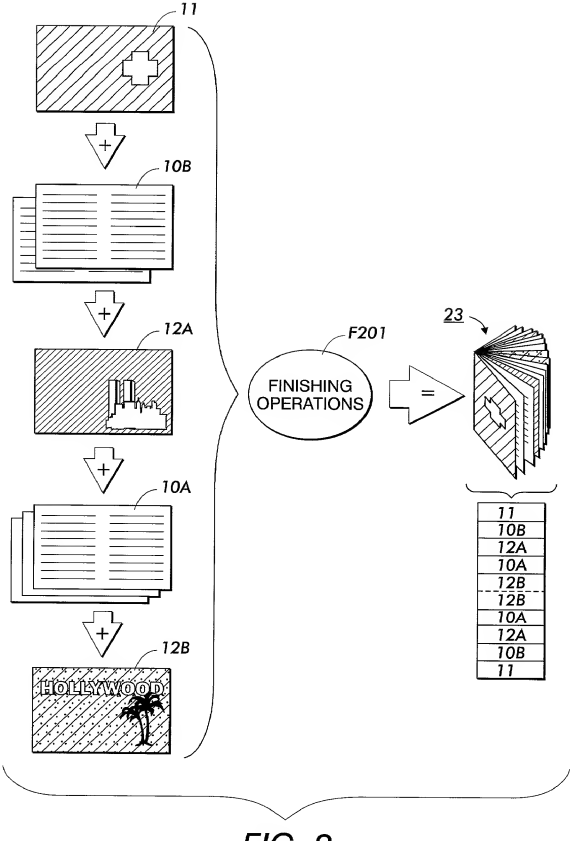
11
10B
12A
10A
12B
HOLLYWOOD
F201
FINISHING OPERATIONS
23
11
10B
12A
10A
12B
12B
10A
12A
10B
11

FIG. 2

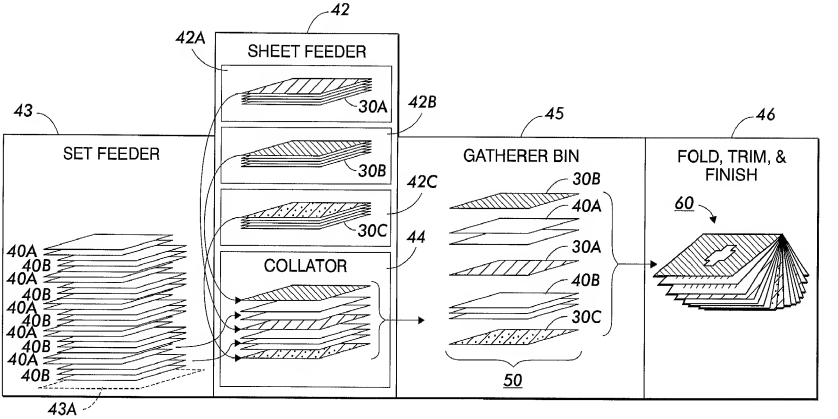
42
42A
SHEET FEEDER
30A
42B
43
45
46
SET FEEDER
30B
GATHERER BIN
FOLD, TRIM, & FINISH
42C
30B
60
30C
44
40A
40B
40A
40B
40A
40B
40A
40B
40A
40B
COLLATOR
30A
40B
30C
50
43A

FIG. 3

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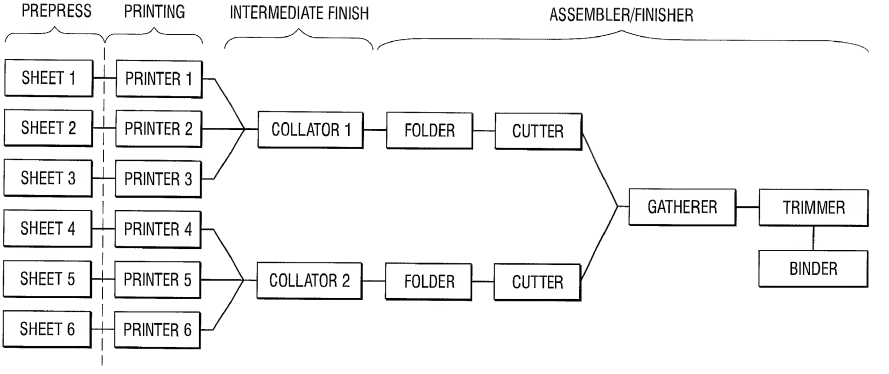


FIG. 4

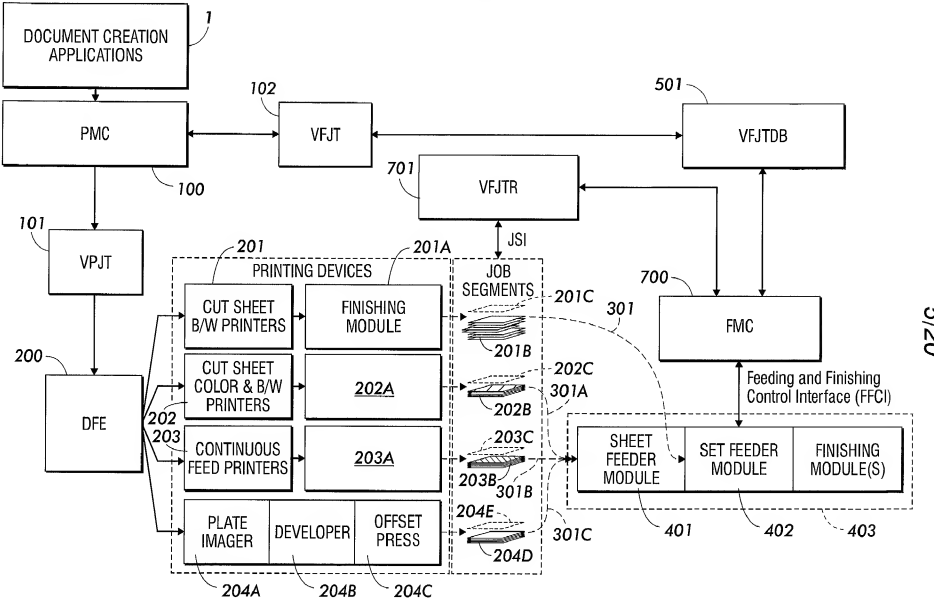

DOCUMENT CREATION APPLICATIONS
1
PMC
100
102
VFJT
501
VFJTDB
701
VFJTR
JSI
101
VPJT
200
DFE
201
PRINTING DEVICES
201A
JOB SEGMENTS
CUT SHEET B/W PRINTERS
FINISHING MODULE
CUT SHEET COLOR & B/W PRINTERS
202A
CONTINUOUS FEED PRINTERS
203A
PLATE IMAGER
DEVELOPER
OFFSET PRESS
202
203
201B
202B
203B
204D
201C
202C
203C
204E
301
301A
301B
301C
700
FMC
Feeding and Finishing Control Interface (FFCI)
SHEET FEEDER MODULE
SET FEEDER MODULE
FINISHING MODULE(S)
401
402
403
204A
204B
204C

FIG. 5

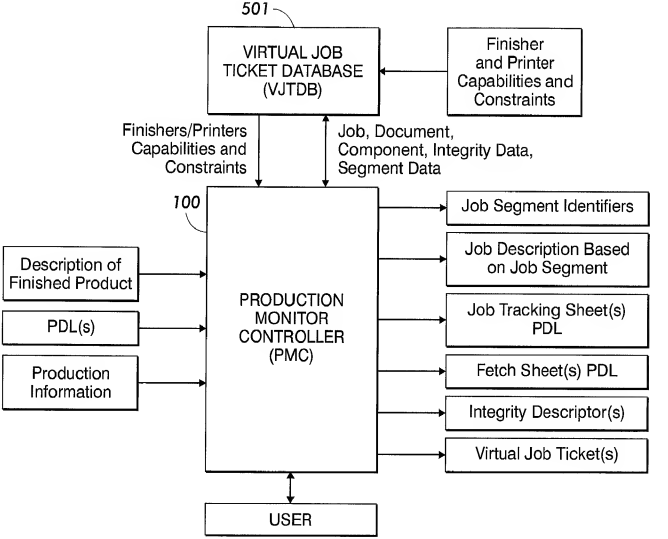

501
VIRTUAL JOB TICKET DATABASE (VJTDB)
Finisher and Printer Capabilities and Constraints
Finishers/Printers Capabilities and Constraints
Job, Document, Component, Integrity Data, Segment Data
100
Description of Finished Product
PDL(s)
Production Information
PRODUCTION MONITOR CONTROLLER (PMC)
Job Segment Identifiers
Job Description Based on Job Segment
Job Tracking Sheet(s) PDL
Fetch Sheet(s) PDL
Integrity Descriptor(s)
Virtual Job Ticket(s)
USER

FIG. 6

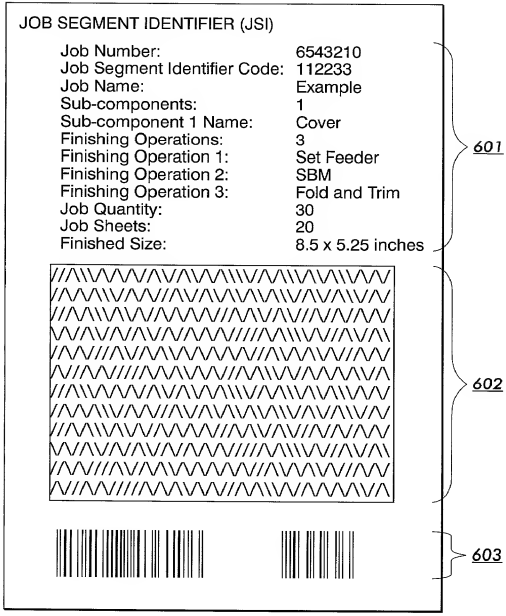

JOB SEGMENT IDENTIFIER (JSI)
Job Number: 6543210
Job Segment Identifier Code: 112233
Job Name: Example
Sub-components: 1
Sub-component 1 Name: Cover
Finishing Operations: 3
Finishing Operation 1: Set Feeder
Finishing Operation 2: SBM
Finishing Operation 3: Fold and Trim
Job Quantity: 30
Job Sheets: 20
Finished Size: 8.5 x 5.25 inches
601
602
603

FIG. 7

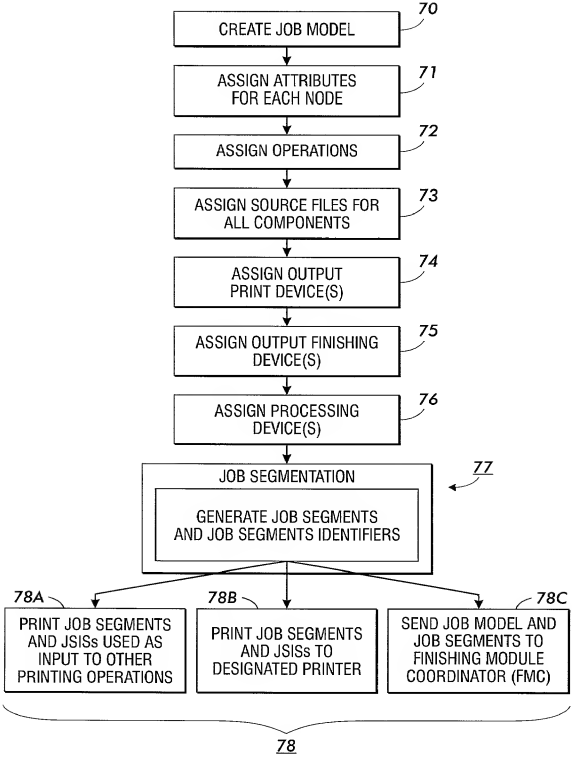

CREATE JOB MODEL
70
ASSIGN ATTRIBUTES FOR EACH NODE
71
ASSIGN OPERATIONS
72
ASSIGN SOURCE FILES FOR ALL COMPONENTS
73
ASSIGN OUTPUT PRINT DEVICE(S)
74
ASSIGN OUTPUT FINISHING DEVICE(S)
75
ASSIGN PROCESSING DEVICE(S)
76
JOB SEGMENTATION
77
GENERATE JOB SEGMENTS AND JOB SEGMENTS IDENTIFIERS
78A
PRINT JOB SEGMENTS AND JSISs USED AS INPUT TO OTHER PRINTING OPERATIONS
78B
PRINT JOB SEGMENTS AND JSISs TO DESIGNATED PRINTER
78C
SEND JOB MODEL AND JOB SEGMENTS TO FINISHING MODULE COORDINATOR (FMC)
78

FIG. 8

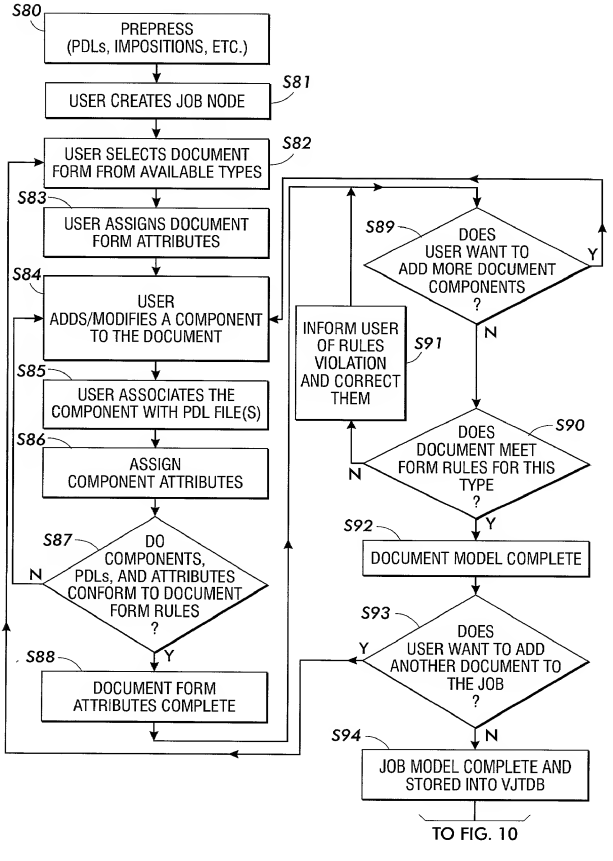
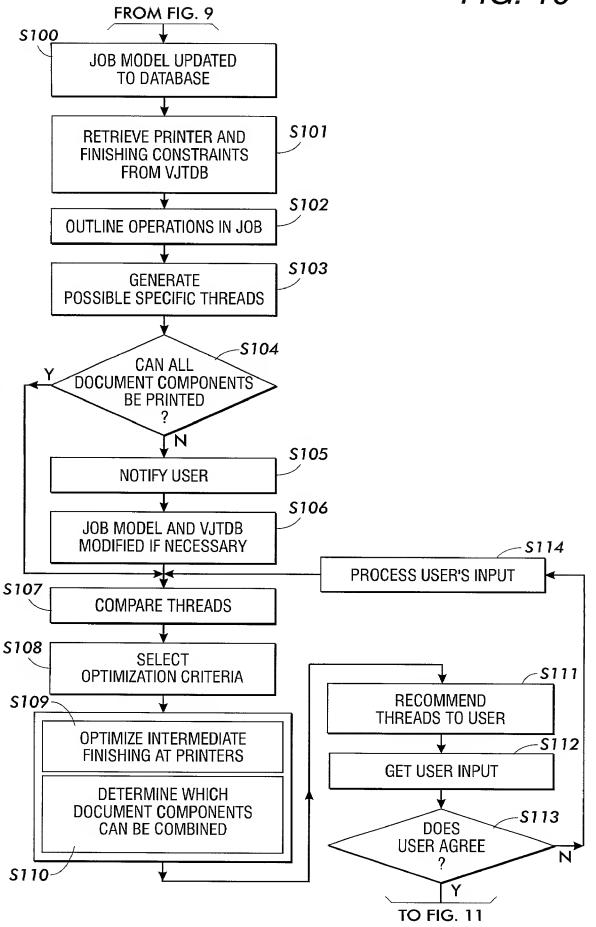

S80
PREPRESS (PDLs, IMPOSITIONS, ETC.)
S81
USER CREATES JOB NODE
S82
USER SELECTS DOCUMENT FORM FROM AVAILABLE TYPES
S83
USER ASSIGNS DOCUMENT FORM ATTRIBUTES
S84
USER ADDS/MODIFIES A COMPONENT TO THE DOCUMENT
S85
USER ASSOCIATES THE COMPONENT WITH PDL FILE(S)
S86
ASSIGN COMPONENT ATTRIBUTES
S87
DO COMPONENTS, PDLs, AND ATTRIBUTES CONFORM TO DOCUMENT FORM RULES ?
N
Y
S88
DOCUMENT FORM ATTRIBUTES COMPLETE
S89
DOES USER WANT TO ADD MORE DOCUMENT COMPONENTS ?
Y
N
S90
DOES DOCUMENT MEET FORM RULES FOR THIS TYPE ?
N
Y
S91
INFORM USER OF RULES VIOLATION AND CORRECT THEM
S92
DOCUMENT MODEL COMPLETE
S93
DOES USER WANT TO ADD ANOTHER DOCUMENT TO THE JOB ?
Y
N
S94
JOB MODEL COMPLETE AND STORED INTO VJTDB
TO FIG. 10

FIG. 9

FIG. 10


FROM FIG. 9
S100
JOB MODEL UPDATED TO DATABASE
RETRIEVE PRINTER AND FINISHING CONSTRAINTS FROM VJTDB
S101
OUTLINE OPERATIONS IN JOB
S102
GENERATE POSSIBLE SPECIFIC THREADS
S103
CAN ALL DOCUMENT COMPONENTS BE PRINTED ?
S104
Y
N
NOTIFY USER
S105
JOB MODEL AND VJTDB MODIFIED IF NECESSARY
S106
PROCESS USER'S INPUT
S114
S107
COMPARE THREADS
S108
SELECT OPTIMIZATION CRITERIA
S109
OPTIMIZE INTERMEDIATE FINISHING AT PRINTERS
DETERMINE WHICH DOCUMENT COMPONENTS CAN BE COMBINED
S110
S111
RECOMMEND THREADS TO USER
S112
GET USER INPUT
S113
DOES USER AGREE ?
Y
N
TO FIG. 11

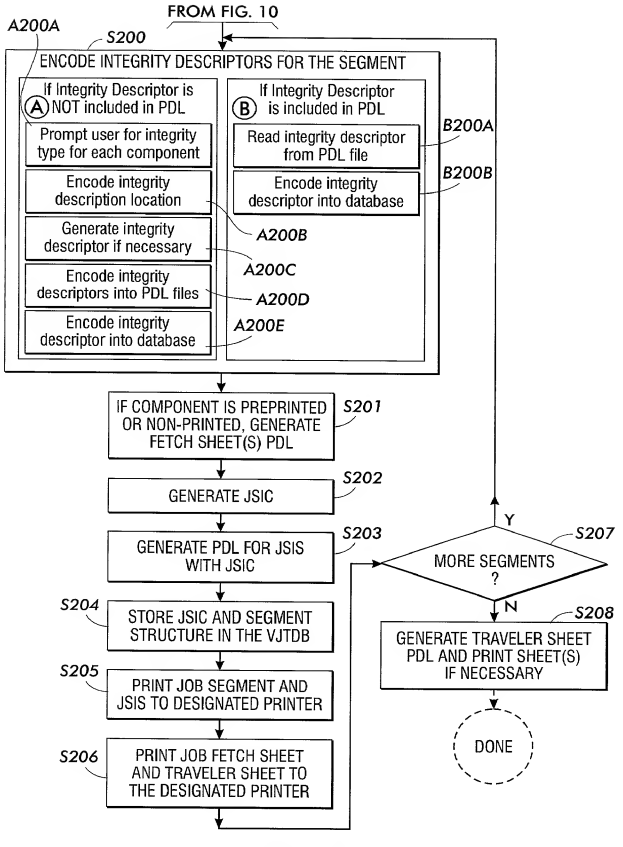

FROM FIG. 10
A200A
S200
ENCODE INTEGRITY DESCRIPTORS FOR THE SEGMENT
If Integrity Descriptor is
A NOT included in PDL
Prompt user for integrity type for each component
Encode integrity description location
Generate integrity descriptor if necessary
Encode integrity descriptors into PDL files
Encode integrity descriptor into database
If Integrity Descriptor
B is included in PDL
Read integrity descriptor from PDL file
Encode integrity descriptor into database
B200A
B200B
A200B
A200C
A200D
A200E
IF COMPONENT IS PREPRINTED OR NON-PRINTED, GENERATE FETCH SHEET(S) PDL
S201
GENERATE JSIC
S202
GENERATE PDL FOR JSIS WITH JSIC
S203
STORE JSIC AND SEGMENT STRUCTURE IN THE VJTDB
S204
PRINT JOB SEGMENT AND JSIS TO DESIGNATED PRINTER
S205
PRINT JOB FETCH SHEET AND TRAVELER SHEET TO THE DESIGNATED PRINTER
S206
MORE SEGMENTS ?
S207
Y
N
GENERATE TRAVELER SHEET PDL AND PRINT SHEET(S) IF NECESSARY
S208
DONE

FIG. 11

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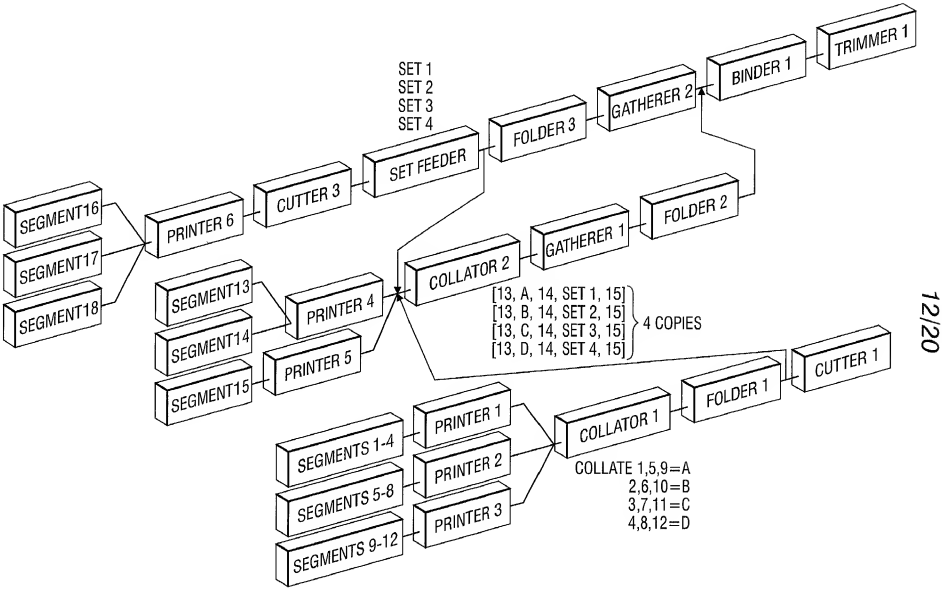


FIG. 12

FIG. 13

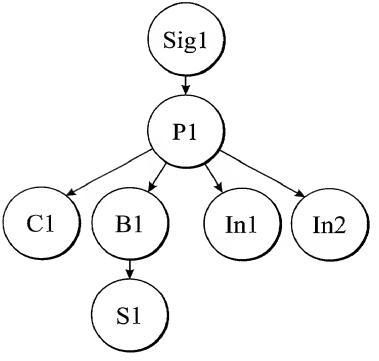
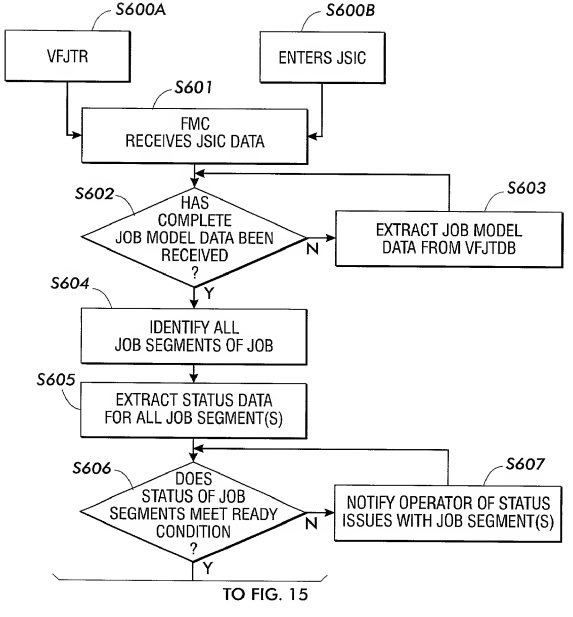


FIG. 14


S600A
VFJTR
S600B
ENTERS JSIC
S601
FMC
RECEIVES JSIC DATA
S602
HAS
COMPLETE
JOB MODEL DATA BEEN
RECEIVED
?
N
S603
EXTRACT JOB MODEL
DATA FROM VFJTDB
Y
S604
IDENTIFY ALL
JOB SEGMENTS OF JOB
S605
EXTRACT STATUS DATA
FOR ALL JOB SEGMENT(S)
S606
DOES
STATUS OF JOB
SEGMENTS MEET READY
CONDITION
?
N
S607
NOTIFY OPERATOR OF STATUS
ISSUES WITH JOB SEGMENT(S)
Y
TO FIG. 15

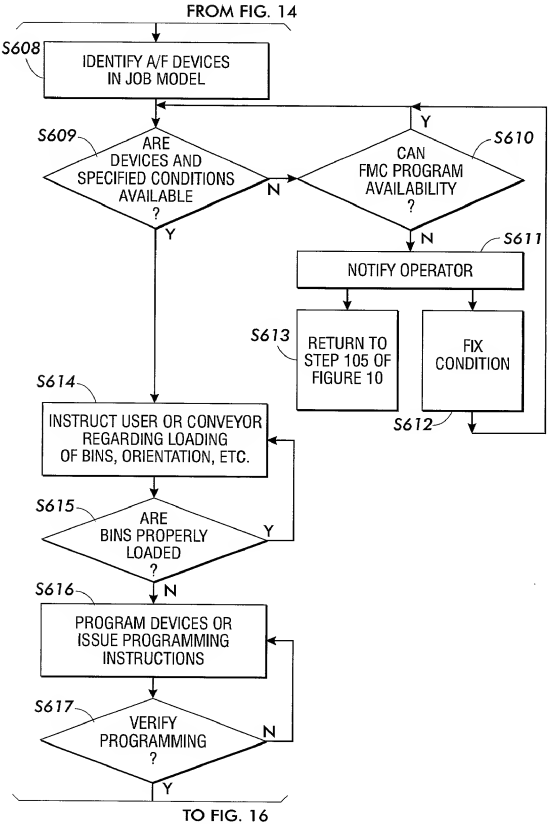

FROM FIG. 14
S608
IDENTIFY A/F DEVICES IN JOB MODEL
S609
ARE DEVICES AND SPECIFIED CONDITIONS AVAILABLE ?
N
Y
S610
CAN FMC PROGRAM AVAILABILITY ?
Y
N
S611
NOTIFY OPERATOR
S613
RETURN TO STEP 105 OF FIGURE 10
FIX CONDITION
S612
S614
INSTRUCT USER OR CONVEYOR REGARDING LOADING OF BINS, ORIENTATION, ETC.
S615
ARE BINS PROPERLY LOADED ?
Y
N
S616
PROGRAM DEVICES OR ISSUE PROGRAMMING INSTRUCTIONS
S617
VERIFY PROGRAMMING ?
N
Y
TO FIG. 16

FIG. 15

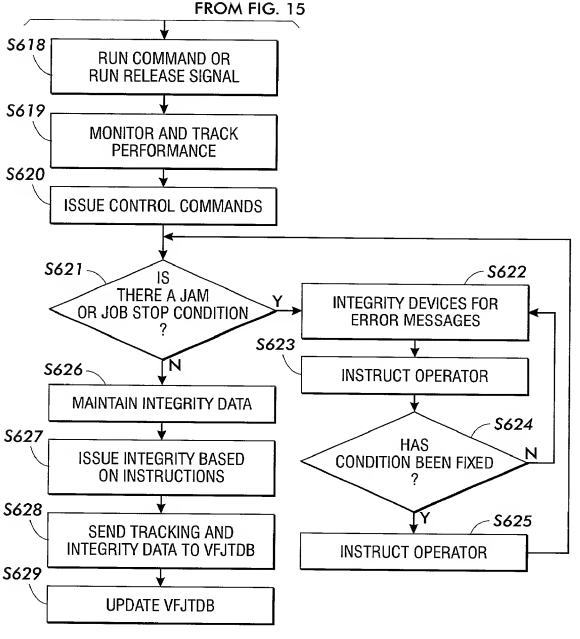

FROM FIG. 15
S618
RUN COMMAND OR RUN RELEASE SIGNAL
S619
MONITOR AND TRACK PERFORMANCE
S620
ISSUE CONTROL COMMANDS
S621
IS THERE A JAM OR JOB STOP CONDITION ?
Y
N
S622
INTEGRITY DEVICES FOR ERROR MESSAGES
S623
INSTRUCT OPERATOR
S624
HAS CONDITION BEEN FIXED ?
Y
N
S625
INSTRUCT OPERATOR
S626
MAINTAIN INTEGRITY DATA
S627
ISSUE INTEGRITY BASED ON INSTRUCTIONS
S628
SEND TRACKING AND INTEGRITY DATA TO VFJTDB
S629
UPDATE VFJTDB

FIG. 16

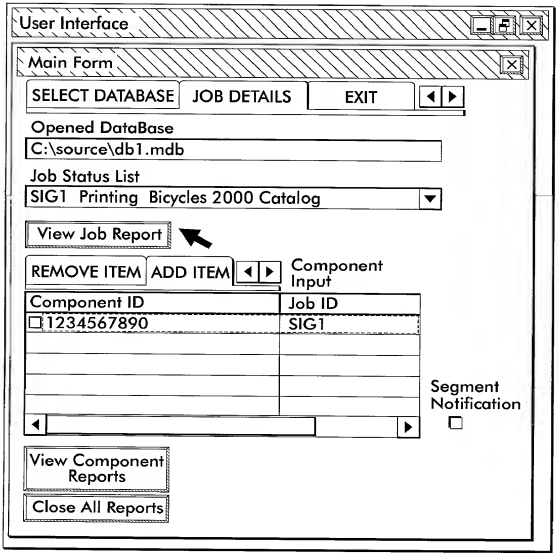


FIG. 17

US 6,535,855 B1

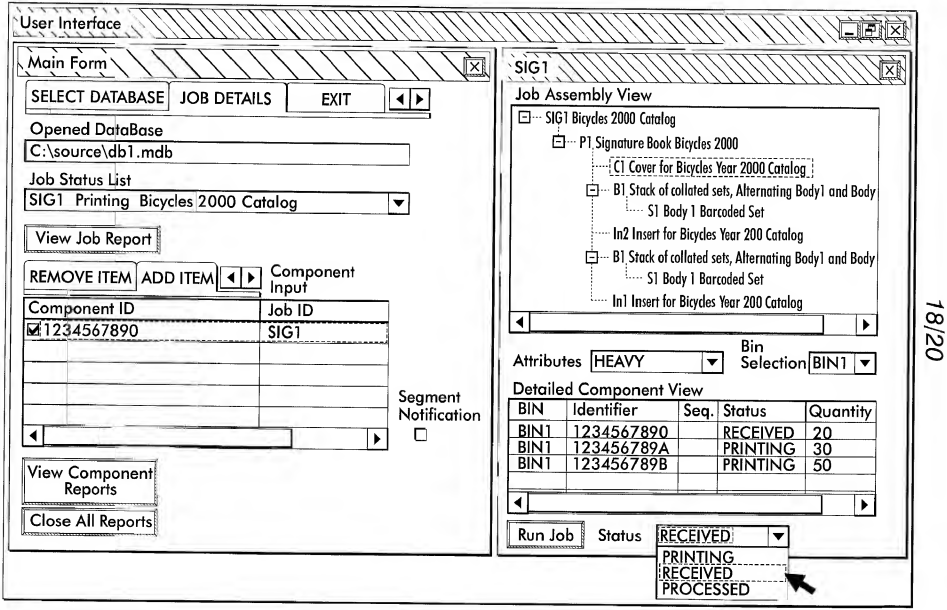

User Interface
Main Form
SELECT DATABASE
JOB DETAILS
EXIT
Opened DataBase
C:\source\db1.mdb
Job Status List
SIG1 Printing Bicycles 2000 Catalog
View Job Report
REMOVE ITEM
ADD ITEM
Component Input
Component ID
Job ID
1234567890
SIG1
Segment Notification
View Component Reports
Close All Reports
SIG1
Job Assembly View
SIG1 Bicycles 2000 Catalog
P1 Signature Book Bicycles 2000
C1 Cover for Bicycles Year 2000 Catalog
B1 Stack of collated sets, Alternating Body1 and Body
S1 Body 1 Barcoded Set
In2 Insert for Bicycles Year 200 Catalog
B1 Stack of collated sets, Alternating Body1 and Body
S1 Body 1 Barcoded Set
In1 Insert for Bicycles Year 200 Catalog
Attributes
HEAVY
Bin Selection
BIN1
Detailed Component View
BIN
Identifier
Seq.
Status
Quantity
BIN1 1234567890 RECEIVED 20
BIN1 123456789A PRINTING 30
BIN1 123456789B PRINTING 50
Run Job
Status
RECEIVED
PRINTING
RECEIVED
PROCESSED

FIG. 18

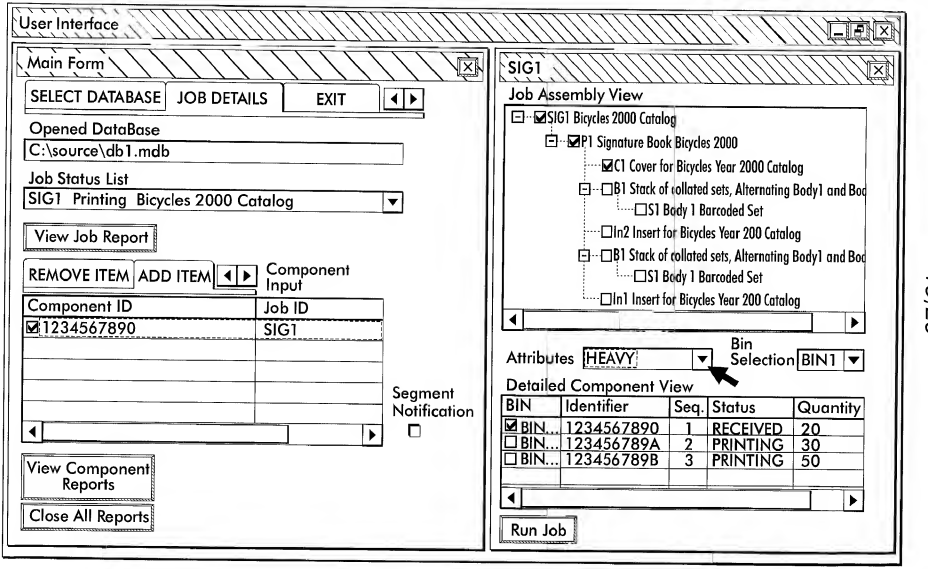

User Interface
Main Form
SELECT DATABASE
JOB DETAILS
EXIT
Opened DataBase
C:\source\db1.mdb
Job Status List
SIG1 Printing Bicycles 2000 Catalog
View Job Report
REMOVE ITEM
ADD ITEM
Component Input
Component ID
Job ID
1234567890
SIG1
Segment Notification
View Component Reports
Close All Reports
SIG1
Job Assembly View
SIG1 Bicycles 2000 Catalog
P1 Signature Book Bicycles 2000
C1 Cover for Bicycles Year 2000 Catalog
B1 Stack of collated sets, Alternating Body1 and Boc
S1 Body 1 Barcoded Set
In2 Insert for Bicycles Year 200 Catalog
B1 Stack of collated sets, Alternating Body1 and Boc
S1 Body 1 Barcoded Set
In1 Insert for Bicycles Year 200 Catalog
Attributes
HEAVY
Bin Selection
BIN1
Detailed Component View
BIN
Identifier
Seq.
Status
Quantity
BIN...
1234567890
1
RECEIVED
20
BIN...
123456789A
2
PRINTING
30
BIN...
123456789B
3
PRINTING
50
Run Job

FIG. 19

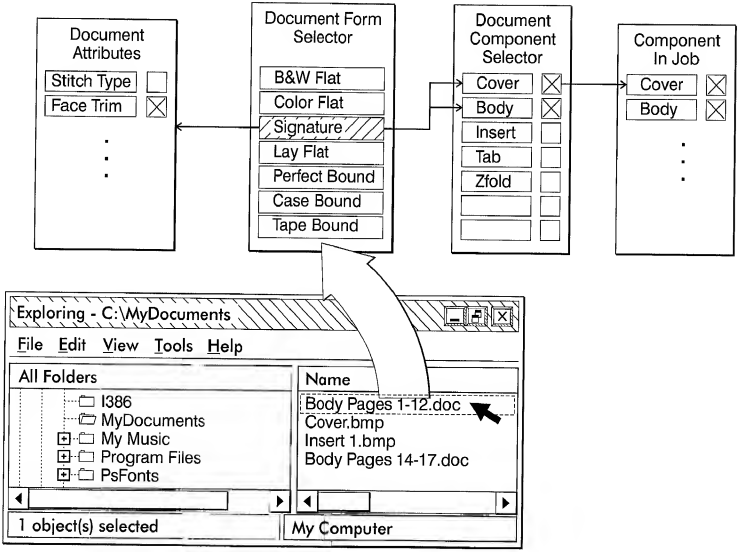

Document Attributes
Stitch Type
Face Trim
Document Form Selector
B&W Flat
Color Flat
Signature
Lay Flat
Perfect Bound
Case Bound
Tape Bound
Document Component Selector
Cover
Body
Insert
Tab
Zfold
Component In Job
Cover
Body
Exploring - C:\MyDocuments
File Edit View Tools Help
All Folders
I386
MyDocuments
My Music
Program Files
PsFonts
Name
Body Pages 1-12.doc
Cover.bmp
Insert 1.bmp
Body Pages 14-17.doc
1 object(s) selected
My Computer

FIG. 20